Education & Public Outreach With MRO's High Resolution Imaging Science Experiment (HiRISE)

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and

The HiRISE Science Team

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Abstract

The HiRISE team is planning an innovative education and public outreach program with a variety of formal and informal educational activities. These include educator workshops, large-scale displays of HiRISE images at museums and planetariums, and opportunities for students and the general public to suggest HiRISE image observations and to participate in data analysis via the internet. Additionally, HiRISE team members have committed to spending at least 5% of their time in outreach activities and to coordinating local EP/O activities in their regions.

The centerpiece of our E/PO program is HiRISE's interactive website called HiWeb (http://marsoweb.nasa.nasa.gov/hirise). HiRISE's public website will provide user-friendly web tools for students, team members, and the general public to suggest target locations for HiRISE imaging. HiWeb will provide interactive viewing and analysis of HiRISE images in context with other available Mars data. Web events, involving participation by team members, will inform students and interested members of the public of HiRISE capabilities and science goals and provide support for submitting good image suggestions. Curriculum modules and activities will focus on Mars geology, the image suggestion process and working with digital image data. We will also provide online opportunities for student and public participation in data analysis to create databases of geologic features (gullies, boulders, craters, wind streaks, etc.) present in the HiRISE images. Educator workshops will be held each year at or near the institution of HiRISE team members. Workshop background materials and instructions for all hands-on activities will be placed on HiWeb to facilitate sharing of information with other educators and the general public. http://hirise.lpl.arizona.edu

HiRISE Public Image Suggestions

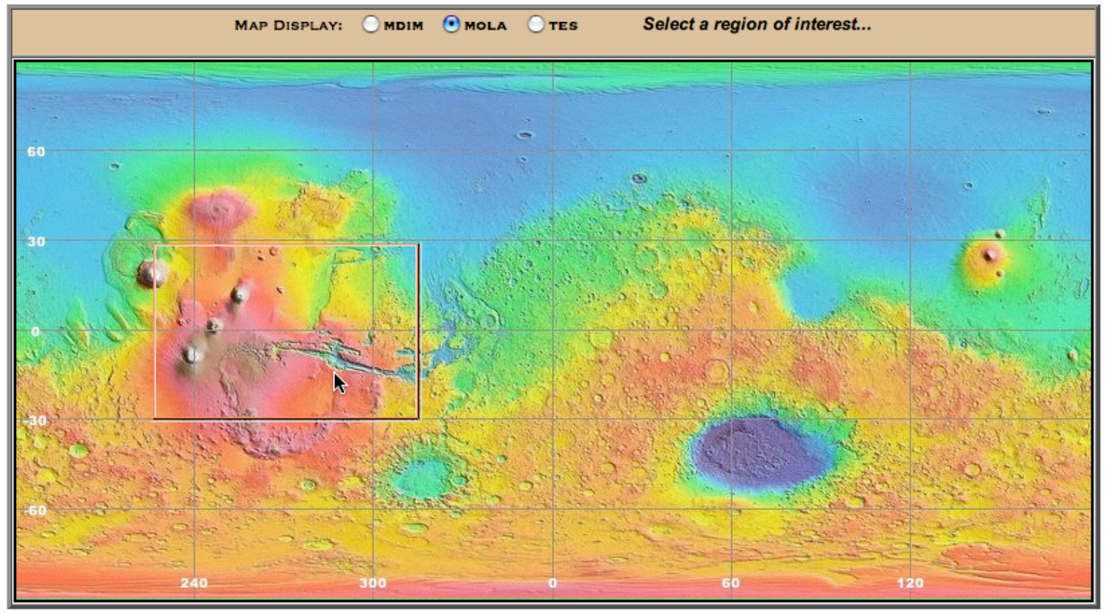
Approximately 10,000 image observations will be taken during the two year primary science phase starting in November 2006. The HiRISE team welcomes and will facilitate involvement by students, the science community and the general public. Starting in March 2006, user-friendly web tools will be available for everyone to view & analyze HiRISE images and to submit image suggestions. Processed images will be released soon after acquisition to allow everyone to share in the scientific discovery process.

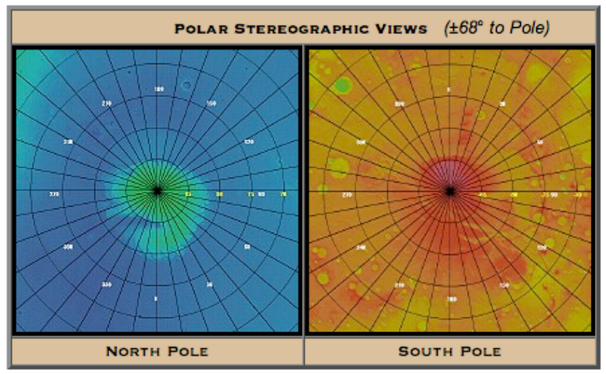
All team members are involved in HiRISE's E/PO effort. In addition, several team members will also be involved in coordinating and prioritizing observations for HiRISE image targeting according to their respective science theme(s). This will help to insure that a variety of imaging observations of high priority are selected.

Coordination of Observations	
Science Theme	**Coordinator**
Climate Change	Candice Hansen
Eolian processses	Nathan Bridges
Fluvial Processes	Virginia Gulick
Future Exploration/Landing Sites	Steve Squyres
Geologic Contacts/Stratigraphy	Cathy Weitz
Glacial Processes	Mike Mellon
Hydrothermal Processes	Virginia Gulick
Impact Processes	John Grant
Landscape Evolution	John Grant
Mass Wasting Processes	Alfred McEwen
Periglacial Processes	Mike Mellon
Polar Geology	Ken Herkenhoff
Seasonal Processes	Candice Hansen
Sedimentary/Layering Processes	Cathy Weitz
Surface Properties *(photometry, composition, regolith, rocks)*	Nick Thomas, Mike Mellon
Tectonic Processes	Laszlo Keszthelyi
Volcanic Processes	Laszlo Keszthelyi

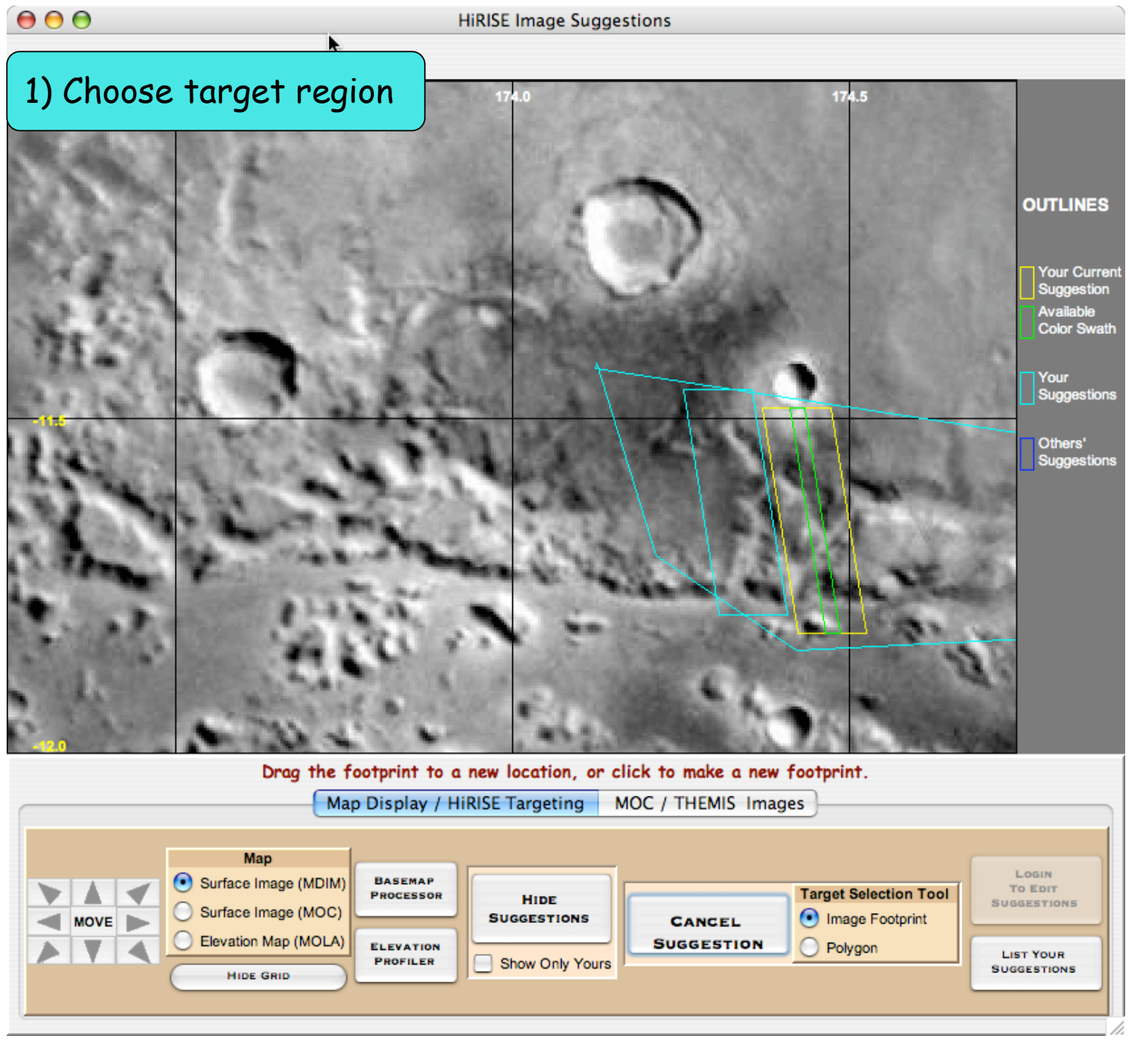
HiRISE High Resolution Imaging Science Experiment

HiRISE Image Suggestion Facility

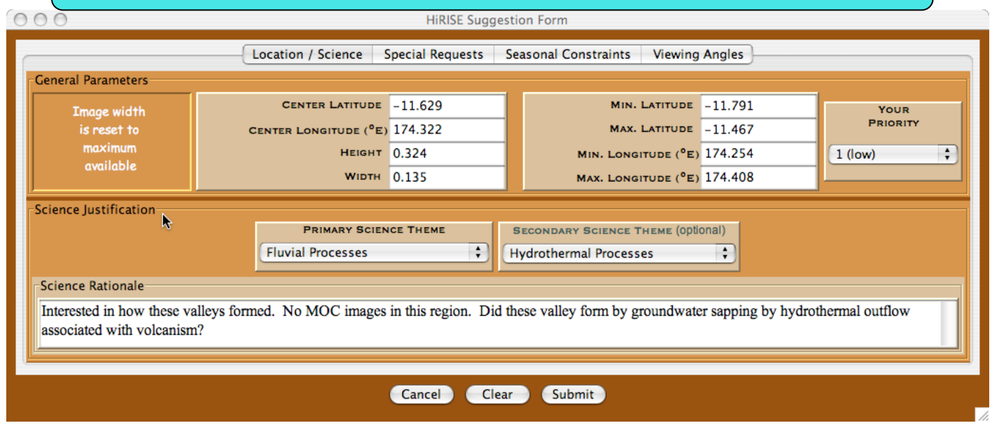




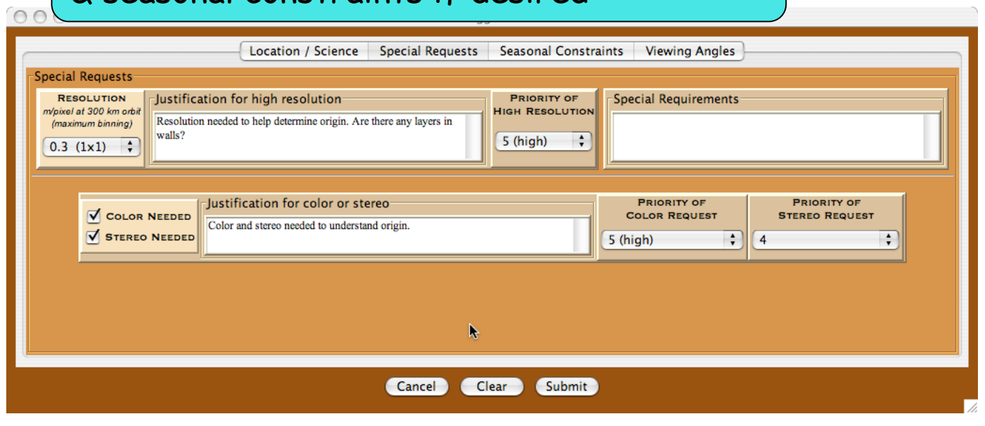
Suggesting a HiRISE Image Target



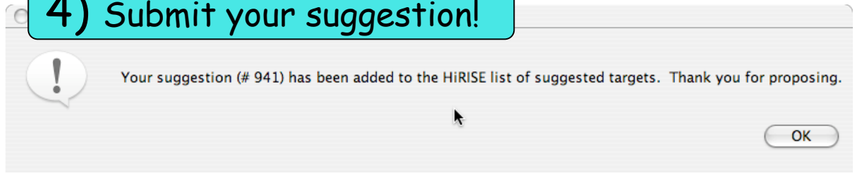
2) Identify Science Theme & give short justification



3) Choose & justify resolution, color, stereo, & seasonal constraints if desired



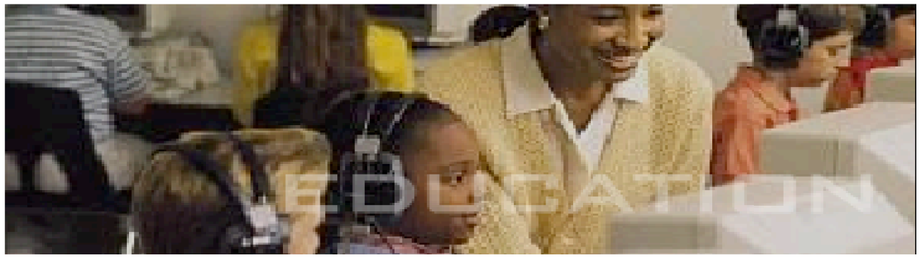
4) Submit your suggestion!



The 'team' version of the HiRISE image suggestion web site (illustrated here) is complete and accepting image suggestions. Over the next few months, we will produce the public site with simpler choices, hints, and a built-in gazetteer to help users find key geographic locations.

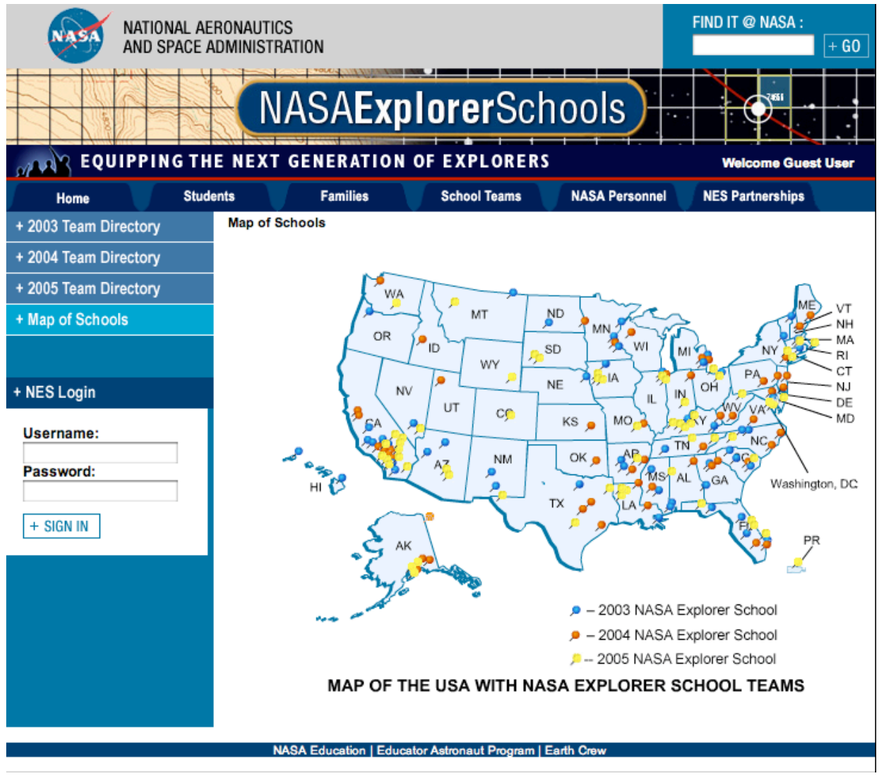
HiRISE Student Imaging

In partnership with NASA Quest (http://quest.arc.nasa.gov), students from across the country will participate in special Internet "Challenges" to select imaging targets and to analyze the data. Science team members will participate in online web chats and webcasts with the students. HiRISE will image as many of the student suggestions as practicable and provide the images back to classrooms, again with webchats and webcasts to help the students understand geology of the images that they suggested.



"HiRISE Challenges" will be advertised widely to more than 3000 science teachers. This advertising will also reach NASA Explorer Schools and schools with under-represented demographics. The team will work to help students choose targets that, because of the MRO orbit and HiRISE's narrow field of view, can actually be imaged within a month or two of the suggestion being made.

This effort is somewhat similar to the ASU Mars Student Imaging Project in which students actually travel to ASU for up to two weeks to work with scientists involved in mission operations and to learn more about Mars. Our effort aims to reach a broader audience by leveraging the Internet and the online interactive tools developed by NASA Quest and the HiRISE team.



Clickworkers

Clickworkers (http://clickworkers.arc.nasa.gov) is NASA's experiment in volunteer science. Through partnership with Clickworkers, HiRISE E/PO will provide the public with opportunities to participate in data analysis and other unique opportunities. The public will be invited to help build databases of geologic features seen in the HiRISE images (e.g.: craters, boulders, wind streaks, gullies, polygons, etc.). HiRISE E/PO will build upon the remarkably popular pilot study where Clickworkers collectively, rapidly and accurately generated a crater database for Mars. Users will be provided with simple tutorials that provide several examples of features to allow accurate identification and information on how the respective features form.

The public may also be invited to participate in some of the following activities that are usually done by the team.

Identifying Terrain Types

Clickworkers will be presented with images and asked to identify terrain types or features present to aid in generating databases of terrains and geologic features present (e.g., dunes, polygonal terrain, fluvial features, etc.) in existing images. This effort will allow searching through images based on content and will help to rapidly generate the building of various databases for the team.

Choosing Press Release Images

Traditionally, press release images are selected by the team for their interest level. However, many images not selected by the team may be interesting to the general public. Therefore, Clickworkers would provide a way for the public to vote on their favorite images to be release with a science caption. In this opportunity, users view random HiRISE images and report how 'interesting' the image looks to them. High interest images become candidates for Picture of Day or press release. ~1/4 of PR or PoD images could come from Clickworkers vote.

Suggesting Interesting regions seen in the MOC images to target with HiRISE

Clickworkers will select interesting regions from a series of MOC images that can be used as HiRISE Image suggestions. Some images will be randomly selected while some will have been seen by 1 to 2 other people. Other images will be very popular targets. Clickworkers will vote for their favorite targets and the website will keep track of the statistics. This process helps to avoid the tendency for everyone to pick the same few targets (volcano summits, Face, etc.)

Is this MOC image interesting?

Evaluating Public Image Suggestions

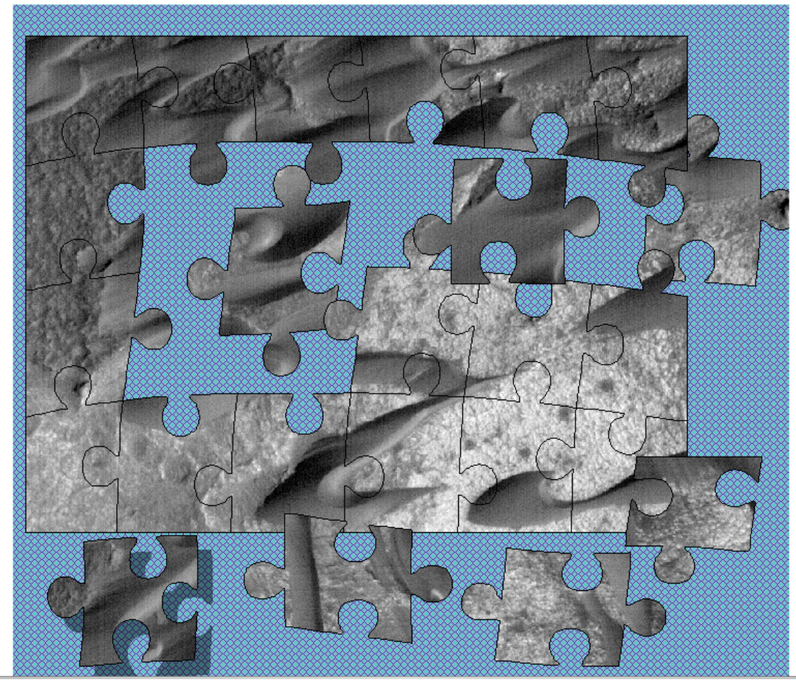
The Public (scientists and everyone else) will submit suggestions via HiWeb. Suggestions with little or no science justification immediately go to Clickworkers. Clickworkers will vote on assigning an 'interest' score to each suggestion. High scoring suggestions are referred back to science team as high priority suggestions. Suggestions with good or thoughtful justification will not go to Clickworkers, but will instead be directly prioritized by the science team.

HiRISE Games and Activities

Online games and activities help make learning about Mars fun for students. These activities also introduce geologic terms and concepts and HiRISE science themes, thus helping to motivate the HiRISE image suggestion process. Interactive scavenger hunts and Mars flash cards will also be added. Games and activities will soon be linked to grade-appropriate tutorials and lessons covering the associated concepts on Mars Geology, image resolution, stereo and color, how the HiRISE camera works and the image suggestion process.

Mars Jigsaw online

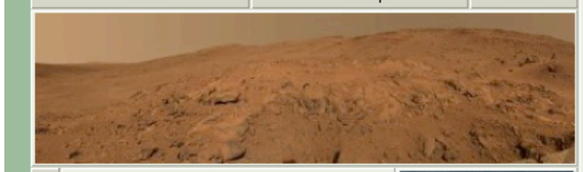
Use your mouse to select puzzle piece and drag it into position. Press the R key or the right mouse button to rotate piece. Press the V key to view the puzzle image and press it once again to make the puzzle image disappear.



What will HiRISE be looking for? (K-3)

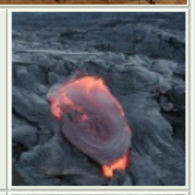
Peek 1 letter | Show errors | Time
Hint | Help | 1:52

What will HiRISE be looking for? (K-3)



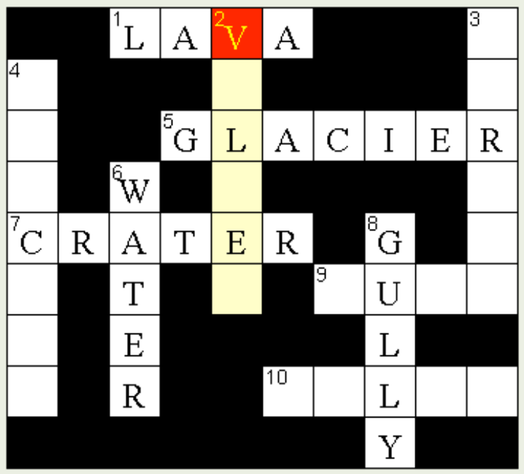
ACROSS

1 Molten rocks from a volcano.



DOWN

2 A low area of land between hills or mountains, often carved by a river or stream.



Hint: Most of the answers relate to topics listed on the HiRISE Science Themes Page.

Return to HiRISE Activity Page

Mars Geography

Help | Time | 1:34

HiRISE

ARABIATERRA
ARESVALLES
CHRYSEPLANITIA
ELYSIUMMONS
GUSEVCRATER
HELLASBASIN
HIGHLANDS
ISIDIS
LOWLANDS
MERIDIANI
NIRGALVALLES
OLYMPUSMONS
TEMPETERRA
THARSIS
THAUMASIAPLATEAU
UTOPIAPLANITIA
VALLESMARINERIS
XANTHETERRA

Click here to download a PDF version of this puzzle you can print.

HiRISE Activities Page

HiRISE Education Partners

The major HiRISE E/PO partners listed below will help the HiRISE team in reaching the broadest audience possible. In addition, individual HiRISE team members are widely distributed (Northern CA, Southern CA, Northern AZ, Southern AZ, NY, DC, CO, Switzerland), and will work closely with their home institutions, various local E/PO partners, schools, museums, planetariums, large-screen theaters and other organizations in their region to organize HiRISE events and activities to help educate and bring the excitement of exploring Mars to their own regions!

Major E/PO Partners & Collaborators	Responsibilities
NASA Quest	Organize web events, chats, forums, and polls to educate and filter student & public suggestions for imaging targets.
MarsQuest	Traveling exhibit will include HiRISE materials.
Space Place &Technology Teacher	Publish & distribute HiRISE curriculum material.
ASU Mars K-12 Education Program & others	Present professional education workshops with HiRISE content.
Smithsonian Institution	Digital projection of HiRISE images before IMAX shows and during intermissions. Image display in renovated "Exploring the Planets" exhibit.
Imagiverse	Translation of HiRISE materials into Spanish and other languages, team interviews, etc.
Clickworkers	Online public participation in data analysis.

G. Gulick	HiRISE CoI; Lead overall E/PO effort; Facilitates local E/PO effort; Manages E/PO web site developers & E/PO coordinator(s) ; N. California outreach, develop E/PO material, activities, and games for website
L. McKibben	Local EPO contact for U. AZ and S. AZ
J. Grant	HiRISE CoI; Local E/PO Washington, D.C. area; partner with Smithsonian
L. Keszthelyi	HiRISE CoI; Local E/PO for N. AZ, HI, Northwestern region
M. Mellon	HiRISE CoI; Local E/PO for Colorado, local educator workshops, MarsQuest content advisor, work with local Denver museum…
C. Weitz	HiRISE CoI; Local E/PO for Washington, DC area
N. Thomas	HiRISE CoI; E/PO in Europe
All other HiRISE team members	Contribute to E/PO efforts
G. Deardorff	HiRISE EPO Website Developer
B. Kanefsky	HiRISE Clickworkers web developer developer for Public Participation in research & data analysis
M. Urquhart	Curriculum developer, local Texas E/PO